

though in regard to abdominal markings they agree with moderately dark specimens of the species. Nothing approaching this variation has been seen from elsewhere, and it therefore seems justifiable to distinguish them under a separate name. It will be interesting to find whether any difference exists in the male.

### **Ochlerotatus curriei**, Coq.

*Culex curriei*, Coquillett, Can. Ent. xxxiii, p. 259 (1901).

*Culex onondagensis*, Felt, N. Y. State Mus. Bull. 79, p. 278 (1904).

*Aedes curriei*, Dyar, Insec. Inscitiae Menst. v, p. 122 (1917).

? *Culex punctatus*, Meigen, Klass. i, p. 6 (1804).

? *Culex dorsalis*, Meigen, Syst. Besch. vi, p. 242 (1830).

? *Grabhamia broquettii*, Theobald, Entomologist, xlvi, p. 179 (1913).

A small series recently received from Wareham Heath, Dorset (*H. Scott*), proves on close examination to represent a species distinct from the one we have usually known as *dorsalis*, though this latter was taken in company with it and *O. salinus*, Fic. The two forms differ as follows:—

*O. caspius*, Pallas (*dorsalis*, auct.). Scales of mesonotum ochreous brown or fawn-coloured, with two narrow white lines running the whole length. Scales of proboscis mostly pale except towards base and tip. Abdominal scales usually of three colours, black, white and ochreous. Wing scales mostly rather broad, dark ones being evenly spread over all the veins, though in varying proportions with the light ones. Dark scales more numerous on the femora. Apical part of basal lobe of side-piece of male genitalia not prominent.

*O. curriei*, Coq. Scales of mesonotum mostly greyish ochreous; a dark brown band of varying width in the middle, extending only about half way from the front; patches of the same colour on each side in front. Scales of proboscis mostly black. Abdominal scales of two colours only, black and greyish white. Wing scales mostly quite narrow; at the base of the wing they are all pale; dark ones predominate on the apical half of the costa, on the first longitudinal vein, and on the forks of the fourth, while on the third and fifth longitudinal veins the scales are almost all dark; elsewhere they are mostly pale. Femora, except towards tips, almost all pale. Apical part of basal lobe of male genitalia prominent.

Meigen's descriptions of *C. punctatus* and *C. dorsalis* do not apply very well either to *O. caspius* or to *O. curriei*, though they almost certainly must refer to one or the other, and perhaps with more probability to the latter. An examination of the types would be essential to settle the point.

The British examples of *O. curriei* only differ from North American specimens in having the dark scales of the wings rather more numerous, especially on the costa. The male genitalia are identical.

### **Ochlerotatus rusticus**, Rossi.

*Culex rusticus*, Rossi, Fauna Etrusca, ii, p. 333 (1790).

*Culex pungens*, Robineau-Desvoidy, Mém. Soc. Hist. Nat. Paris, iii, p. 407 (1827).

*Culex quadratimaculatus*, Macquart, Suit. à Buffon, i, p. 34 (1834).

*Culex diversus*, Theobald, Mon. Cul. ii, p. 73 (1901).

*Culex quadratimaculatus*, Villeneuve, Bull. Soc. Ent. France, p. 55 (1919).

On a careful comparison of fresh specimens with Robineau-Desvoidy's description I entirely agree with Dr. Villeneuve in his identification. He has however overlooked the fact that the name *quadraticulatus* was an unwarranted substitution by Macquart for Desvoidy's *pungens*; moreover I consider it is equally evident from Rossi's description that his *C. rusticus* refers to the more strongly marked form of *diversus* with a continuous median dorsal yellow line. This being the oldest name must replace all the others.

**Ochlerotatus antipodeus**, sp. nov.

♀. *Head* with narrow golden scales in the middle; on each side a patch of narrow black ones, and external to these a small patch of flat white ones; upright scales and bristles blackish, except for a pair of golden bristles directed forwards over the eyes. Proboscis and palpi black-scaled, the latter about one-seventh as long as the former. *Thorax* dark brown; mesonotum with blackish bristles and dark reddish-brown scales; narrow golden scales arranged in five rather definite lines: one median, extending from the front margin to just before the scutellum, where it forks; a subdorsal pair on the posterior half of the mesonotum; and a lateral pair on the anterior third; some scattered narrow golden scales about the middle, and a patch of the same above the bases of the wings. Prothoracic lobes with a few golden scales; area behind them (proepimerum) with small flat blackish-brown ones. Mid lobe of scutellum with narrow golden scales in the middle, narrow dark brown ones laterally; lateral lobes with a few narrow dark brown scales. Pleurae with patches of flat white scales. *Abdomen* clothed mainly with blackish brown scales; small white lateral basal patches on each segment and narrow yellowish white basal bands on segments 2-5. Cerci elongate, blackish. *Legs* black-scaled; femora whitish beneath; narrow white rings on the bases of the first three tarsal joints, broadest on the hind legs, where there are also a few white scales at the bases of the last two joints. Claw formula 1.1:1.1:0.0. *Wings* with blackish scales, those in the lateral series almost linear. First fork-cell fully twice as long as its stem, its base a little nearer the wing-base than that of the second. Cross-veins separated by quite twice the length of the posterior one. Halteres yellowish with brown knob.

*Length* (without proboscis), 5 mm.

NEW ZEALAND: Karikari Bay, 5.ii.1916, 14♀ (incl. type) (Albert E. Brookes); Te Horo, near Wellington, 3♀ (received through R. F. L. Burton).

**Ochlerotatus lepidonotus**, sp. nov.

♂. *Head* with a small area of yellowish narrow curved scales in the middle, mixed yellow and black upright forked scales on each side of these, and whitish flat scales more outwardly. Proboscis black. Palpi longer than the proboscis by the last joint. Long joint mainly pale scaled, but also with many black scales which are specially numerous towards the base and apex; its apical fourth much swollen, with long dense hairs on its outer side, which are orange basally, black apically. Penultimate joint about the size of the swollen portion of the long joint; with whitish scales basally, black-scaled apically; internally and ventrally with long dense orange hairs with black tips; a few shorter stiff black hairs on the outer side

at the apex. Terminal joint slightly longer and distinctly thicker than the penultimate; with whitish scales at the base, otherwise black, black-haired. *Thorax* with black integument; mesonotum with pale yellowish scales and bristles (denuded in middle). Pleurae (except sternopleura) densely clothed with flat whitish scales. Postnotum with a tuft of pale yellowish narrow curved scales apically. *Abdomen* clothed mainly with pale greyish ochreous scales, with some blackish brown ones intermixed to a varying extent; in the darkest specimen the pale scales are confined to rather narrow bands across the bases and apices of the segments, the remainder being all black; venter mainly whitish. *Genitalia*: side-pieces less than four times as long as broad, with rather dense dark brown hairs on the apical half, but none overhanging the harpagones; external margin slightly curved; internal practically straight, except for an indentation just posterior to the basal lobes. Basal lobes very small, with a tuft of hairs, none differentiated; apical lobes barely distinguishable, with a few short hairs. Claspers with a straight and rather stout terminal spine. Harpagones just over half as long as the side-pieces, the stems pubescent, four times as long as the appendage, which is rather narrow, slightly curved and frayed at the tip. Harpes undivided, a little shorter than the stem of the harpagones. *Legs*: femora and tibiae mainly with pale ochreous scales except towards the tips, where the scales are black. Tarsi black, except for numerous pale scales towards the base of the first joint. Claw formula 2.1:2.1:1.1. *Wings* very scantily scaled; the scales brown, except for those on the subcosta, and the base of the costa and first, second, fourth, fifth and sixth longitudinal veins, which are pale yellowish. Fork cells about as long as their stems, the upper with its base much beyond that of the lower.

♀. Palpi nearly a third as long as the proboscis, black, with scattered whitish scales. Scarcely any black scales on the abdomen. Claw formula 1.1:1.1:1.1. Wing-scales rather more numerous, and mostly pale yellowish, except those on the costa and first longitudinal vein.

*Length* (without proboscis), 7–8.5 mm.

MACEDONIA: 4♂ (including type), 10♀, swept in meadow near Galiko R., Salonica, 26. iv. 1918 (*Capt. J. Waterston*).

A very distinct species, with one remarkable characteristic, the possession of scales on the postnotum. In some respects, notably the form of the male palpi, it resembles *O. rusticus*, which, it is interesting to note, was taken at the same time and place.

### ***Ochlerotatus (Finlaya) echinus*, sp. nov.**

*Ochlerotatus lateralis*, Edwards, Bull. Ent. Res. ii, p. 250 (1911) (*nec* Meigen).

*Ochlerotatus ornatus*, Edwards, Bull. Ent. Res. iii, p. 21 (1912) (? *nec* Meigen).

*Ochlerotatus geniculatus*, Edwards, Bull. Ent. Res. iv, p. 49 (1913) (*nec* Olivier).

Differs as follows from the common *O. geniculatus*:—The four dark stripes of the mesonotum are brown instead of black, and are separated by narrow golden, instead of whitish lines; the sides of the mesonotum are almost pure white, instead of yellowish white; the scutellar scales are broad, flat and white; the abdominal segments have narrow basal yellowish bands in addition to the white lateral spots; and the hind femora have a dark dorsal line on the basal half.

MACEDONIA: Stavros, near Salonica, 1918, 1 ♀ (type) reared from larva (*Capt. J. Waterston*). MOROCCO: 1 ♀ caught on horse and mule outside Fez, v. 1909 (*Major C. E. P. Fowler*). ALGERIA: 1 ♀ (Dr. Sargent; no data).

In the absence of a male, the best distinctive character which can be adduced is the presence of flat scales on the scutellum; the larva also is very different from that of *O. geniculatus*, hence this form must undoubtedly be regarded as specifically distinct. The Moroccan and Algerian specimens have the flat scutellar scales, but in thoracic markings appear to agree with typical *O. geniculatus*; hence they are somewhat doubtfully conspecific with the type.

### **Culex apicalis**, Adams.

*Culex apicalis*, Adams, Kans. Univ. Sci. Bull. ii, p. 26 (1903).

*Culex territans*, Howard, Dyar & Knab, Monogr. iii, p. 293 (1915) (*nec* Walker).

*Culex territans*, Schneider, Verh. Natf. Ver. Bonn, lxx, p. 45 (1913).

*Culex hortensis*, Edwards, Ent. Mo. Mag. (3) i, p. 167 (1915) (*nec* Ficalbi).

*Culex saxatilis*, Dyar, Insec. Inscitiae Menstr. vii, p. 36 (1919).

*Culex pyrenaicus*, Brölemann, Ann. Soc. Ent. France, 1918, p. 427 (1919).

Specimens of *C. pyrenaicus* sent me by Dr. Villeneuve from Rambouillet, France, agree in almost every detail with North American specimens in the British Museum, the only distinction discernible being that the harpagones of the male genitalia are more noticeably serrated on their tips. This difference is so minute that I consider the specific identity of the European and North American forms to be unquestionable, particularly in view of the fact that the male genitalia vary slightly among American specimens.

The species can be readily separated in both sexes from *C. hortensis*, Fic., by the white spots at the tips of the hind femora and tibiae being very small or absent; the wing scales also are perceptibly broader. *Capt. J. Waterston* has recently discovered the larvae of both *C. apicalis* and *C. hortensis* in the neighbourhood of Salonica, and from an examination of his material it can be positively stated that the larva figured by Schneider is that of *C. apicalis* and not of *C. hortensis* as I suggested in 1915.

Dyar, in the paper quoted, discusses the synonymy of the species, and from the evidence he adduces I should certainly conclude that *C. apicalis* is the correct name for the species, *C. testaceus*, v. d. Wulp, being too doubtful to be made use of.

### **Culex aurantapex**, Edw.

*Culex aurantapex*, Edwards, Bull. Ent. Res. v, p. 74 (1914).

*Taeniorhynchus domesticus*, Leicester, Cul. of Malaya, p. 169 (1908) (*nec* *Culex domesticus*, Germar).

I described this species from a single female from Nairobi. Recently a female and three males reared from larvae have been received from Dar-es-Salaam (*A. W. J. Pomeroy*). Although these specimens differ from the type in having slightly broader wing-scales and more numerous pale scales on the wings and legs, there seems little reason to doubt their specific identity with the Nairobi example. They appear to agree in every respect with specimens of Leicester's *T. domesticus*. As Leicester

points out, the wing scales are decidedly narrower than in *C. bitaeniorhynchus*, a difference which, together with a slight distinction in the male genitalia, will probably suffice to distinguish the two forms specifically.

The genitalia are rather peculiar (fig. 1). The apical lobe of the side-pieces has the flat plate much reduced, little more than a flattened bristle; in addition there are four or five undifferentiated bristles and two stout spines. The harpes have only a minute basal appendage. The "harpagones" are divided into two pairs of strong

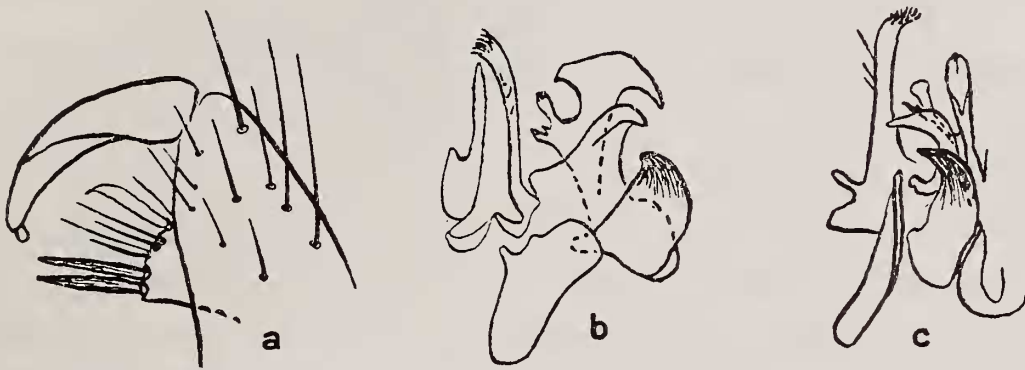


Fig. 1. Male genitalia of *Culex aurantapex*, Edw.; a, apex of side pieces; b, harpes and harpagones, side view; c, the aedeagus, dorsal view (one side only).

sickle-shaped plates directed dorsally, the ventral pair is the longer, and gives off ventrally from its base an appendage which divides into a rounded knob and two strong teeth. In the typical *C. bitaeniorhynchus* of the Oriental region, as well as in the var. *ethiopicus*, Edw., this ventral appendage of the second harpagonal plate is much reduced and differently formed.

The var. *ethiopicus* differs from the typical *bitaeniorhynchus* chiefly in having the upper (or basal) sickle-shaped plate of the harpagones much broader than the lower (or apical). The other points of distinction given (Bull. Ent. Res. iii, p. 30, 1912) do not hold good. Specimens of this form were also reared by Mr. Pomeroy at Dar-es-Salaam. The larvae seem to be indistinguishable.

### ***Culex watti*, sp. nov.**

♂. *Head* scales mostly whitish. *Palpi* longer than the proboscis by nearly the length of the last two joints, which are densely hairy. Long joint with a narrow whitish ring before the middle, and another broader one in the middle of the apical half. Last two joints with narrow pale basal rings, creamy above, white below; hairs at tip of last joint also pale; penultimate joint with a short white streak on underside just beyond middle. *Proboscis* brown, with a narrow, distinct though not sharply margined pale ring beyond the middle. *Thorax* brown-scaled, without special ornamentation, except that the scales on and in front of the scutellum and in front of the wing-bases are paler. *Abdomen* dark brown, the segments with dull whitish basal bands of about even width, those on segments 6 and 7 considerably expanded laterally. *Genitalia* (four specimens mounted): side-pieces normal, rather closely resembling those of *C. trifilatus*, Edw. (Bull. Ent. Res. v, p. 64), but the clasper is a little more narrowed apically, and on the lobe the modified bristles in each set of three (anterior to the plate) are of about equal length; the one adjoining the plate has a more flattened tip. *Unci* distinct, pointed. *Harpagones*

with only two incompletely separated divisions, the first sickle-shaped, the point directed ventrally and touching the second, which is broad and flattened horizontally. Harpes with the usual crown of spines, but without any trace of a basal thumb-like projection; their sides straight and parallel. *Legs* brown; femora whitish beneath almost to the tips; a distinct pale spot at apex of hind tibiae, which are also obscurely pale along the inner side; the faintest suggestion of pale rings at the tarsal articulations, most distinct at the junction of the first and second hind tarsal joints. *Wings* with linear-lanceolate brown scales; bases of fork cells practically level.

♀. Resembles the male, but the pale band of the proboscis is much more evident on the underside than above, and is much broader and very ill-defined basally. Middle tibiae in one specimen with a very indistinct pale longitudinal stripe in front.

*Length* (without proboscis), 5 mm.

GOLD COAST: 4♂ (including type) 2♀, Kumasi, 1919 (*Dr. W. G. Watt*).

EAST AFRICA: 4♂ 2♀, Dar-es-Salaam, 30.i.1918 (*A. W. J. Pomeroy*).

The most obvious characters of this species are the banded proboscis and palpi of the male, together with the practically unbanded legs. The specimens agree in most respects with Theobald's description of *C. ataeniata*; I have however examined the type in the Liverpool School of Tropical Medicine, and consider it to be only *C. univittatus*, with which indeed the present species might easily be confused.

The genitalia are most distinct, and clearly show that *C. watti* is more nearly related to *C. duttoni* than to any other African species; *C. duttoni* differs chiefly in having the harpagones undivided, elongate, and bent at right angles in the middle. In adult coloration *C. duttoni* differs obviously in the ringed tarsi and striped tibiae.

### **Theobaldia arctica**, sp. nov.

♂. Differs from *T. annulata*, Schrank, as follows:—Palpi rather more slender and darker, both hairs and scales on the last two joints being almost all black. Femora without any trace of pre-apical pale rings; hind tibiae without pre-apical pale patch on the outer side, but with a narrow longitudinal pale streak along the inner side; first tarsal joint of all the legs almost entirely black, only a very few white scales at the base.

*Genitalia*: seventh sternite pointed, with an irregular row of ten stout close-set spines at the tip. Basal lobes of side-pieces small, with two stout bent setae and a number of hairs. Side-pieces also with a distinct pre-apical prominence on the inner side which is densely hairy. Harpes rather slender, more swollen at the tip, where they have four or five small serrations. Harpagones\* rather slender, a little shorter than the harpes, their tips sharply pointed and hooked dorsally. Unci small, pointed, half as long as the harpagones.

N. RUSSIA: 1♂, Archangel, 25.ix.1918 (*Capt. A. G. Carment*).

In coloration and genital structure this insect agrees almost entirely with *T. alaskaensis*, Ludlow, and may in fact be the same. Judging from Dyar and Knab's

\* These are the structures called "unci" by Howard, Dyar & Knab, but as they are undoubtedly homologous with the "harpagones" of *Culex* I use this term for them. The same names are used in quite different senses in different genera of CULICIDAE, and the terminology of the parts of the male genitalia of these and other Diptera is badly in need of revision and unification.

figure, however, the harpes are differently toothed and the subapical prominences and hair-tufts of the side-pieces are more strongly developed than in *alaskaensis*. The genitalia of *T. annulata* differ in the entire absence of stout spines on the seventh sternite and of any preapical prominence or hair-tuft on the side-pieces, and in the differently toothed harpes and less distinctly hooked harpagones.

**Theobaldia indica**, sp. nov.

Coloration entirely as in *T. arctica*.

*Genitalia*: seventh sternite with a group of about seven short stout spines on its pointed tip. Side-pieces over three times as long as broad; basal lobes and apical prominences practically as in *T. arctica*. Harpes very slender, very little expanded apically, the tip being slightly cleft into two, but otherwise untoothed. Harpagones slightly longer than the harpes and very broad, nearly half as broad (vertically) as they are long; a small sharp, backwardly directed hook on the dorsal margin at some distance before the tip, which is rounded.

PUNJAB, INDIA: 1♂ (type), Bakloh, 28.ii.1900 (*Capt. Lindesay*); 1♀, Umballa, 9.iii.1905, and 1♀, Dalhousie, 4.v.1906 (*Col. H. J. W. Barrow*).

The specimen recorded by Giles (*Gnats*, ed. i, p. 206) from Bakloh is probably this species; the male recorded by Theobald (*Mon. Cul.* i, p. 335) is the type described above. No specimens of the true *T. annulata* from India are in the British Museum collection.





## ON SOME AFRICAN DELPHACIDAE (HOMOPTERA).

By F. MUIR.

Very little is known about the African DELPHACIDAE, especially the tropical forms. For this reason it is worth recording the few species represented in a small collection made by Mr. J. C. Bridwell at Oloke-Meji, Ibadan, Nigeria, in 1914. All the specimens were swept from grasses and reeds. It is to be hoped that larger collections will soon be available and that those who work at them will examine and give figures or adequate descriptions of the genitalia, especially of the aedeagus. Owing to the wide distribution of some species and the great difference in colour of some of the macropterous and brachypterous forms, and to the variation in colour of other species, and the paucity of good specific distinctions in the chroötic characters, it is almost impossible to identify many species of the *Delphacides* group without making use of the phallic characters.

The types of the new species are deposited in the collection of the Hawaiian Sugar Planters' Association, Honolulu, Hawaii. Measurements are from the apex of vertex to anus and from the base to apex of one tegmen.

**Tropidocephalus brunnipennis**, Sign.

One male and one female from Oloke-Meji. The male genitalia of this specimen are identical with those of specimens from Australia (*T. eximius*, Kirk.)

**Perkinsiella** sp.

One female, which is closely allied to *P. bakeri*, Muir, from the Philippine Islands, but I fully expect the male to be distinct. This genus in the Pacific is always attached to sugar-cane. It would be of interest to know if this is so in Africa, and to ascertain what parasites keep them in check.

**Delphacodes disonymos** (Kirk).

*Delphax disonymos*, Kirkaldy (1907), Haw. Sugar Planters' Assn. Ent. Bull. iii, p. 151, line 10, p. 155, Pl. xviii, fig. 4.

*Delphacodes disonymos* (Kirk.), Muir (1917), Proc. Haw. Ent. Soc. iii, 4, p. 333.

*Delphax matanitu*, Kirkaldy (1907), *op. cit.* p. 151, line 13, p. 155, Pl. xvi, figs. 4, 5, Pl. xviii, fig. 15.

*Delphacodes matanitu* (Kirk.), Muir (1917), *op. cit.* p. 333; Muir (1918), *op. cit.* iii, p. 427, fig. 3.

I consider these two species of Kirkaldy's as being the long and short winged forms of the same species. His two figures of the pygofers are drawn from different positions and so appear slightly different; the aedeagi are the same. A similar case of difference in colour of the tegmina is found, I believe, in *D. erectus nigripennis* (Crawford), which I consider to be the brachypterous form of *D. erectus* (Crawford).